

# Preface

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Version 1.0

## Disclaimer

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## Federal Communications Commission (FCC)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment onto an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Shielded interconnect cables and a shielded AC power cable must be employed with this equipment to ensure compliance with the pertinent RF emission limits governing this device. Changes or modifications not expressly approved by the system's manufacturer could void the user's authority to operate the equipment.

## **Declaration of Conformity**

This device complies with part 15 of the FCC rules. Operation is subject to the following conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

This device is in conformity with the following EC/EMC directives:

- EN 55022** Limits and methods of measurement of radio disturbance characteristics of information technology equipment
- EN 61000-3-2** Disturbances in supply systems caused
- EN 61000-3-3** Disturbances in supply systems caused by household appliances and similar electrical equipment "Voltage fluctuations"
- EN 55024** Information technology equipment-Immunity characteristics-Limits and methods of measurement
- EN 60950** Safety for information technology equipment including electrical business equipment
- CE marking**



## **Canadian Department of Communications**

This class B digital apparatus meets all requirements of the Canadian Interference-causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada.

## **About the Manual**

The manual consists of the following:

<b>Chapter 1</b>	Describes features of the ➔ page 1
<b>Introducing the Motherboard</b>	motherboard.
<b>Chapter 2</b>	Describes installation of ➔ page 7
<b>Installing the Motherboard</b>	motherboard components.
<b>Chapter 3</b>	Provides information on us- ➔ page 29
<b>Using BIOS</b>	ing the BIOS Setup Utility.
<b>Chapter 4</b>	Describes the motherboard ➔ page 59
<b>Using the Motherboard Software</b>	software.
<b>Chapter 5</b>	Provides basic trouble shoot- ➔ page 63
<b>Trouble Shooting</b>	ing tips.

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# Chapter 1

## *Introducing the Motherboard*

### Introduction

Thank you for choosing the **H87H3-TI** motherboard. This motherboard is a high performance, enhanced function motherboard designed to support the LGA1150 socket for Intel® 4<sup>th</sup> Generation Core™ Family processors for high-end business or personal desktop markets.

This motherboard is based on Intel® H87 Express Chipset for best desktop platform solution. It supports up to 16 GB of system memory with dual channel DDR3 1600/1333 MHz SO-DIMM. Two mini PCI Express slots are for extending usage.

It integrates USB 2.0 ports and USB 3.0 interface, supporting up to five USB 2.0 ports (two 10-pin USB 2.0 headers support four USB 2.0 ports and one 5-pin USB 2.0 header supports additional one USB 2.0 port) and six USB 3.0 ports (four USB 3.0 ports at the rear panel and one USB 3.0 header supports two USB 3.0 ports).

This motherboard is equipped with advanced full set of I/O ports in the rear panel, including one DC\_IN port, one HDMI in port (For All-In-One Specification), one HDMI out port, one Display port (DP), four USB 3.0 ports, one RJ45 LAN connector, and audio jacks for line-out and microphone.

In addition, this motherboard supports two SATA 6Gb/s connectors for storage expansion.

### Package Contents

Your motherboard package ships with the following items:

- H87H3-TI Motherboard
- User Manual
- DVD
- I/O Shield
- 1 SATA Cable and 1 SATA/Power Cable



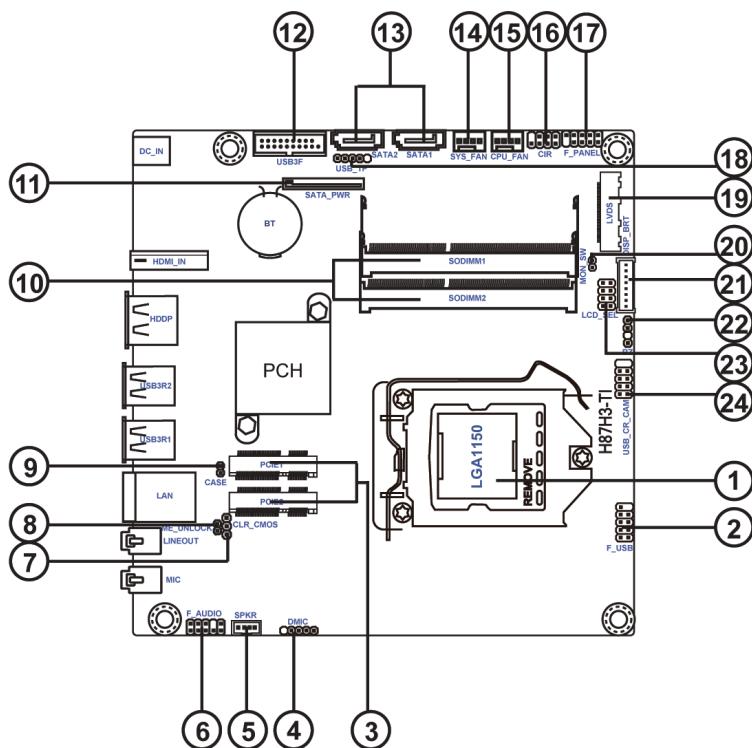
*Accessories may vary, please refer to actual goods you purchase.*

## Specifications

<b>CPU</b>	<ul style="list-style-type: none"> <li>LGA1150 socket for Intel® 4<sup>th</sup> Generation Core™ Family processors</li> <li>VRD 12.5</li> </ul>
<b>Chipset</b>	<ul style="list-style-type: none"> <li>Intel® H87 Chipset</li> <li>Supports Intel® Smart Response Technology</li> <li>Supports Intel® Smart Connect Technology</li> <li>Supports Intel® Rapid Start Technology</li> </ul>
<b>Memory</b>	<ul style="list-style-type: none"> <li>Dual-channel DDR3 memory architecture</li> <li>2 x 204-pin DDR3 SO-DIMM sockets support up to 16 GB</li> <li>Supports DDR3 1600/1333 MHz DDR3 SDRAM</li> </ul>
<b>Expansion Slots</b>	<ul style="list-style-type: none"> <li>2 x mini PCI Express slots             <ul style="list-style-type: none"> <li>- mini PCIe1 (full-card) supports extension cards with SATA signal, USB signal and PCIe signal.</li> <li>- mini PCIe2 (half-card) supports extension cards with PCIe signal.</li> </ul> </li> </ul>
<b>Storage</b>	<ul style="list-style-type: none"> <li>Supported by Intel® H87 Express Chipset</li> <li>- 2 x Serial ATA 6Gb/s devices</li> </ul>
<b>Audio</b>	<ul style="list-style-type: none"> <li>Realtek ALC662</li> <li>- 2 Channel High Definition Audio Codec</li> <li>- Compliant with HD audio specification</li> </ul>
<b>LAN</b>	<ul style="list-style-type: none"> <li>Realtek RTL8111G</li> <li>- 10/100/1000 Fast Ethernet Controller</li> <li>- Wake-on-LAN and remote wake-up support</li> </ul>
<b>Rear Panel I/O</b>	<ul style="list-style-type: none"> <li>1 x 19V DC_IN port</li> <li>1 x HDMI in port (For All-In-One Specification)</li> <li>1 x Display port (DP)</li> <li>4 x USB 3.0 ports</li> <li>1 x RJ45 LAN connector</li> <li>1 x Audio port (1 x line-out, 1 x Microphone)</li> <li>1 x HDMI out port</li> </ul>
<b>Internal I/O Connectors &amp; Headers</b>	<ul style="list-style-type: none"> <li>1 x 4-pin CPU_FAN connector with smart fan function</li> <li>1 x 4-pin SYS_FAN connector with smart fan function</li> <li>1 x USB 3.0 header supports additional two USB 3.0 ports</li> <li>2 x 10-pin USB 2.0 headers support additional four USB 2.0 ports             <ul style="list-style-type: none"> <li>- 1 x 10-pin USB 2.0 header (black) supports card reader and camera or other USB 2.0 device</li> <li>- 1 x 10-pin USB 2.0 header (gray) supports additional two USB 2.0 devices</li> </ul> </li> <li>1 x 5-pin USB 2.0 header supports additional one USB 2.0 port</li> <li>2 x Serial SATA 6Gb/s connectors</li> <li>1 x Case open header</li> <li>1 x Front Panel switch/LED header</li> <li>1 x Front Panel audio header</li> <li>1 x Clear CMOS jumper</li> </ul>

	<ul style="list-style-type: none"> <li>• 1 x ME Unlock header</li> <li>• 1 x SATA power connector</li> <li>• 1 x Buzzer header</li> <li>• 1 x Consumer infrared header (CIR)</li> <li>• 1 x Digital microphone header (For All-In-One Specification)</li> <li>• 1 x 2 channel audio speaker header (For All-In-One Specification)</li> <li>• 1 x LCD panel select jumper (For All-In-One Specification)</li> <li>• 1 x LVDS connetor (For All-In-One Specification)</li> <li>• 1 x LVDS brightness switch header (For All-In-One Specification)</li> <li>• 1 x LVDS brightness control header (For All-In-One Specification)</li> </ul>
<b>TPM</b>	<ul style="list-style-type: none"> <li>• Embedded Nuvoton NPCT420AAOWX TPM IC supports TPM version 1.2</li> </ul>
<b>System BIOS</b>	<ul style="list-style-type: none"> <li>• AMI BIOS with 64Mb SPI Flash ROM <ul style="list-style-type: none"> <li>- Supports Plug and Play</li> <li>- Supports ACPI &amp; DMI</li> <li>- Supports STR (S3) /STD (S4)</li> <li>- Supports Hardware monitor</li> <li>- Audio, LAN, can be disabled in BIOS</li> <li>- F7 hot key for boot up devices option</li> <li>- Supports PgUp clear CMOS Hotkey (Has PS2 KB Model only)</li> <li>- Supports Dual/Triple Display (depends on display output)</li> <li>- Supports EZ BIOS (1024 x 768 resolution, GUI UEFI)</li> <li>- Supports Multi-Language</li> <li>- Supports AC'97/HD Audio auto detect (default)</li> <li>- Supports Blue-Ray DVD display</li> <li>- Resume By USB(S3) BIOS setting default (Enable)</li> </ul> </li> </ul>
<b>Bundled Software/ Feature</b>	<ul style="list-style-type: none"> <li>• Supports Norton Anti Virus/Cyberlink Media Suite</li> </ul>
<b>Form Factor</b>	<ul style="list-style-type: none"> <li>• Thin Mini ITX Size, 170mm x 170mm</li> </ul>

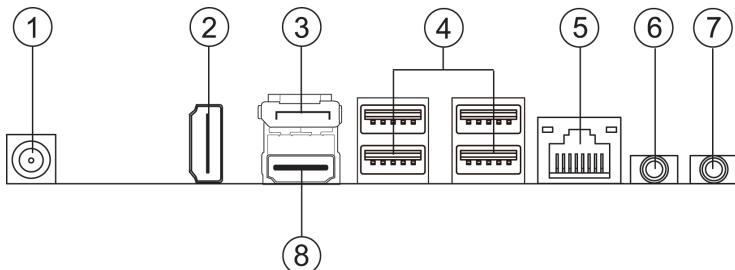
# Motherboard Components



**Table of Motherboard Components**

LABEL	COMPONENTS
1. CPU_Socket	LGA1150 socket for Intel® 4 <sup>th</sup> Generation Core™ Family Processors
2. F_USB	Front panel USB 2.0 header
3. PCIE1~2	Mini PCI Express slots (mini PCIe1 (full-card) supports extension cards with SATA signal, USB signal and PCIe signal, and mini PCIe2 (half-card) supports extension cards with PCIe signal.)
4. DMIC	Digital microphone header (For All-In-One Specification)
5. SPKR	2 Channels audio speaker header (For All-In-One Specification)
6. F_AUDIO	Front panel audio header
7. CLR_CMOS	Clear CMOS jumper
8. ME_UNLOCK	Me unlock header
9. CASE	Case open header
10. SODIMM1~2	204-pin DDR3 SDRAM SO-DIMMs
11. SATA_PWR	SATA power connector
12. USB3F	Front panel USB 3.0 header
13. SATA1~2	Serial ATA 6Gb/s connectors
14. SYS_FAN	4-pin system cooling fan connector with smart fan function
15. CPU_FAN	4-pin CPU cooling fan connector with smart fan function
16. CIR	Consumer infrared header
17. F_PANEL	Front panel switch/LED header
18. USB_TP	5-pin USB 2.0 header supports one USB 2.0 device
19. LVDS	LVDS connector (For All-In-One Specification)
20. MON_SW	LVDS brightness switch header (For All-In-One Specification)
21. DISP_BRT	LVDS brightness control header (For All-In-One Specification)
22. BZ	Buzzer header
23. LCD_SEL	LCD panel select jumper (For All-In-One Specification)
24. USB_CR_CAM	10-pin USB 2.0 header supports card reader and camera or other USB 2.0 device

## I/O Ports



### 1. 19V DC\_IN Port

Connect the DC\_IN port to the power adapter.

### 2. HDMI\_IN Port (For All-In-One Specification)

You can connect the HDMI output of other computer or other HDMI source to the HDMI\_IN port.

PC	HDMI_IN port	LCD_MODE button pulse
Power ON	Un-plugged	PC → LCD off
Power OFF	Plugged	HDMI → LCD off
Power ON	Plugged	PC → HDMI → LCD off
Power OFF	Un-plugged	LCD off



1. Please press button to switch the mode manually, it will not be automatically switched when inserting the HDMI cable.

2. When HDMI\_IN is in use, front panel audio header will be invalid.

### 3. Display Port (DP)

You can connect the display device to the display port.

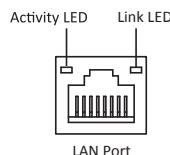
### 4. USB 3.0 Ports

Use the USB 3.0 ports to connect USB 3.0 devices.

### 5. LAN Port

Connect an RJ-45 jack to the LAN port to connect your computer to the Network.

LAN LED	Status	Description
Activity LED	OFF	No data
	Orange blinking	Active
Link LED	OFF	No link
	Green	Link



### 6. Line-out (lime)

It is used to connect to speakers or headphones.

### 7. Microphone (pink)

It is used to connect to a microphone.

### 8. HDMI\_OUT Port

You can connect the display device to the HDMI\_OUT port.

# Chapter 2

## Installing the Motherboard

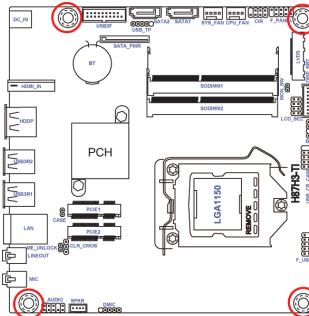
### 2-1. Safety Precautions

Follow these safety precautions when installing the motherboard:

- Wear a grounding strap attached to a grounded device to avoid damage from static electricity.
- Discharge static electricity by touching the metal case of a safely grounded object before working on the motherboard.
- Leave components in the static-proof bags.
- Always remove the AC power by unplugging the power cord from the power outlet before installing or removing the motherboard or other hardware components.

### 2-2. Installing the motherboard in a Chassis

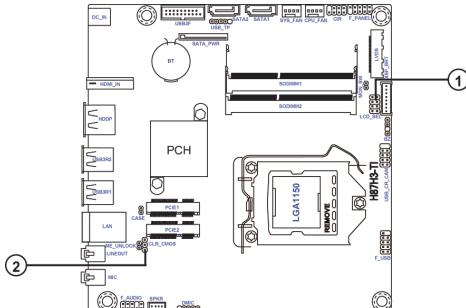
This motherboard carries a Thin Mini ITX form factor of 170 x 170 mm. Choose a chassis that accommodates this form factor. Make sure that the I/O template in the chassis matches the I/O ports installed on the rear edge of the motherboard. Most system chassis have mounting brackets installed in the chassis, which corresponds to the holes in the motherboard. Place the motherboard over the mounting brackets and secure the motherboard onto the mounting brackets with screws.



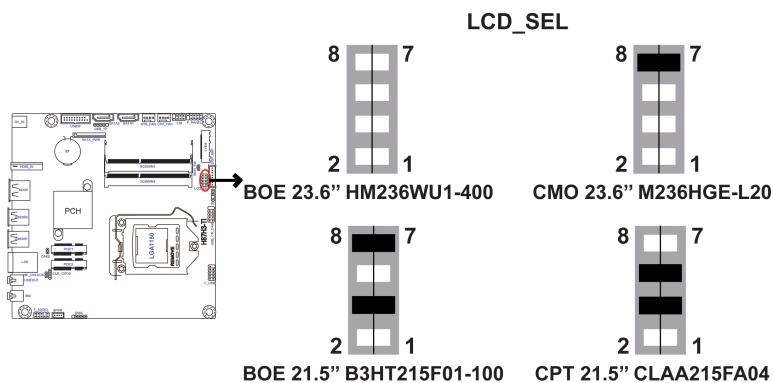
*Do not over-tighten the screws as this can stress the motherboard.*

## 2-3. Checking Jumper Settings

This section explains how to set jumpers for correct configuration of the motherboard.



### 1. LCD\_SEL: LCD panel select header (For All-in-One Specification)

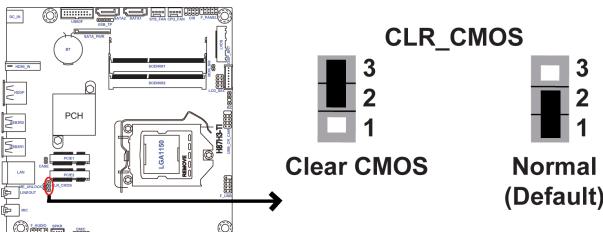


1. When your panel connects to LVDS, please check LCD\_SEL header setting first.

2. Due to the differences of the panel parameters, please follow the above illustration to place the jumper caps.

## 2. CLR\_CMOS: Clear CMOS jumper

The following illustration shows the location of the motherboard jumpers. Pin 1 is labeled.

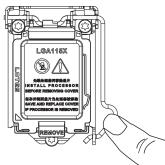


*To avoid the system instability after clearing CMOS, we recommend users to enter the main BIOS setting page to "Load Default Settings" and then "Save and Exit Setup".*

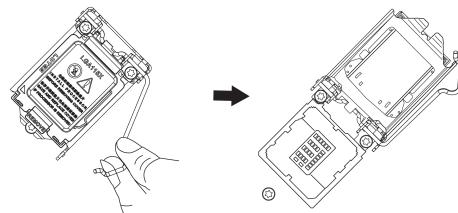
## 2-4. Installing Hardware

### 2-4-1. Installing the Processor

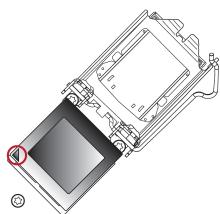
- This motherboard has an LGA1150 socket.
  - When choosing a processor, consider the performance requirements of the system. Performance is based on the processor design, the clock speed and system bus frequency of the processor, and the quantity of internal cache memory and external cache memory.
  - You may be able to change the settings in the system Setup Utility. We strongly recommend you do not over-clock processor or other components to run faster than their rated speed.
  - The following illustration shows CPU installation components.
- A. Press the hook of lever down with your thumb and pull it to the right side to release it from retention tab.



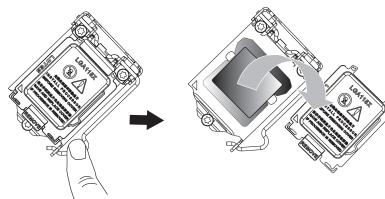
- B. Lift the tail of the load lever and rotate the load plate to fully open position.



- C. Grasp the edge of the package substrate. Make sure pin 1 indicator is on your bottom-left side. Aim at the socket and place the package carefully into the socket by purely vertical motion.



D. Rotate the load plate onto the package IHS (Intergraded Heat Spreader). Engage the load lever while pressing down lightly onto the load plate. Secure the load lever with the hook under retention tab. Then the cover will flick automatically.

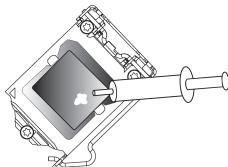


*Please save and replace the cover onto the CPU socket if processor is removed.*

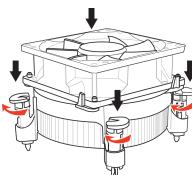
## 2-4-2. Installing the CPU Cooler

- Install the cooling fan in a well-lit work area so that you can clearly see the motherboard and processor socket.
- Avoid using cooling fans with sharp edges in case the fan casing and the clips cause serious damage to the motherboard or its components.
- To achieve better airflow rates and heat dissipation, we suggest that you use a high quality fan with 3800 rpm at least. CPU fan and heat sink installation procedures may vary with the type of CPU fan/heatsink supplied. The form and size of fan/heatsink may also vary.
- DO NOT remove the CPU cap from the socket before installing a CPU.
- Return Material Authorization (RMA) requests will be accepted only if the motherboard comes with the cap on the LGA1150 socket.
- The following illustration shows how to install CPU fan.

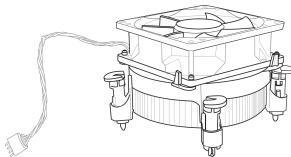
A. Apply some thermal grease onto the contacted area between the heatsink and the CPU, and make it to be a thin layer.



B. Fasten the cooling fan supporting base onto the CPU socket on the motherboard. And make sure the CPU fan is plugged to the CPU fan connector.



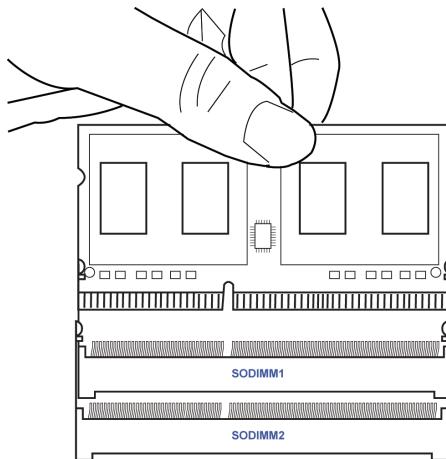
C. Connect the CPU cooler power connector to the CPU\_FAN connector.



### 2-4-3. Installing Memory Modules

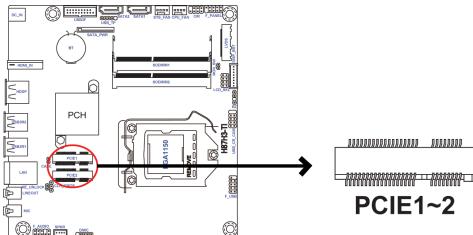
- This motherboard accommodates two memory modules. It can support two 204-pin DDR3 1600/1333 MHz.
- Do not remove any memory module from its antistatic packaging until you are ready to install it on the motherboard. Handle the modules only by their edges. Do not touch the components or metal parts. Always wear a grounding strap when you handle the modules.
- You must install at least one module in any of the two slots. Total memory capacity is 16 GB.
- Refer to the following to install the memory modules.

Install the DIMM module into the slot and press it firmly down until it fits in place. Check that the cutouts on the DIMM module edge connector match the notches in the DIMM slot.



## 2-4-4. Installing Add-on Cards

The slots on this motherboard are designed to hold expansion cards and connect them to the system bus. Expansion slots are a means of adding or enhancing the motherboard's features and capabilities. With these efficient facilities, you can increase the motherboard's capabilities by adding hardware that performs tasks that are not part of the basic system.



### PCIE1~2 Slots

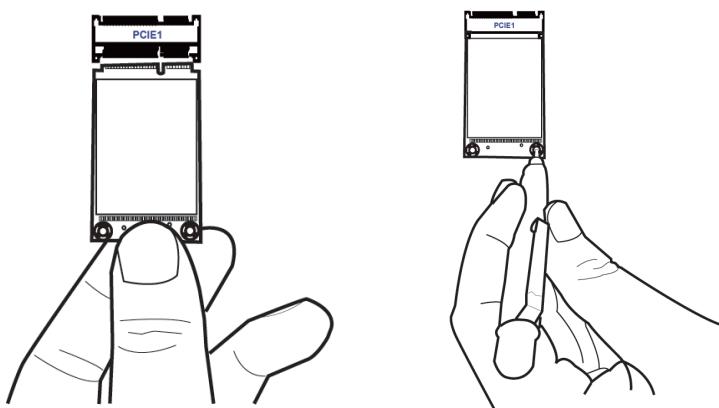
The mini PCIe1 (full-card) supports SATA signal, USB signal and PCIe signal for extending usage of mSATA card and TV tuner card, and mini PCIe2 (half-card) supports extension cards with PCIe signal.



*Before installing an add-on card, check the documentation for the card carefully. If the card is not Plug and Play, you may have to manually configure the card before installation.*

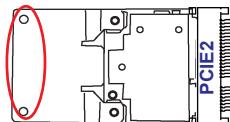
Follow these instructions to install a mSATA card or TV tuner card:

- 1 Insert a Mini SATA (mSATA) card or TV tuner card into the PCIE1 Slot.
- 2 Lower the handle and tighten the screws.

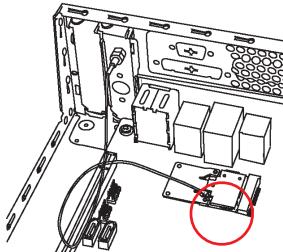


Follow these instructions to install a wireless card:

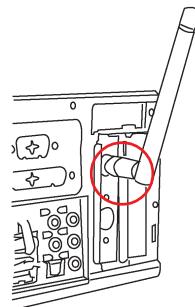
- 1 Remove a blanking plate from the system case, and insert the wireless card into the PCIE2 slot rightwards, then tighten the screw (Please refer to Picture 1).
- 2 Press the metal connector of the cable into the connector on the wireless card. Ensure that the metal connector is correctly seated (Please refer to Picture 2).
- 3 Make the other end of the cable (with a gold screw) through the upper hole of the bracket, and tighten the antenna on to the gold screw after installing a metal gasket on the screw (Please refer to Picture 3).



Picture 1



Picture 2

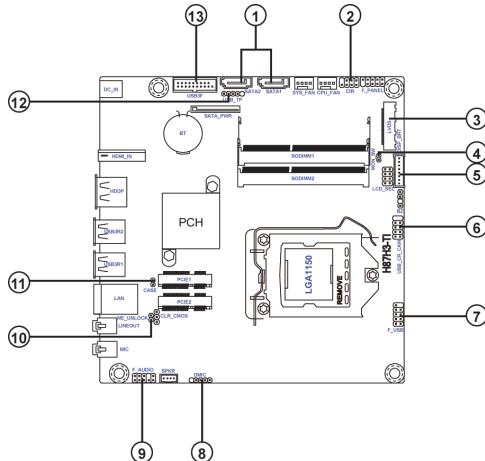


Picture 3

\* For reference only

## 2-4-5. Connecting Optional Devices

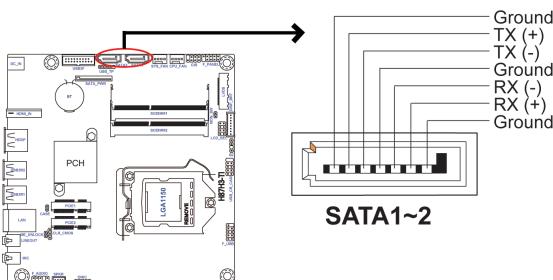
Refer to the following for information on connecting the motherboard's optional devices:



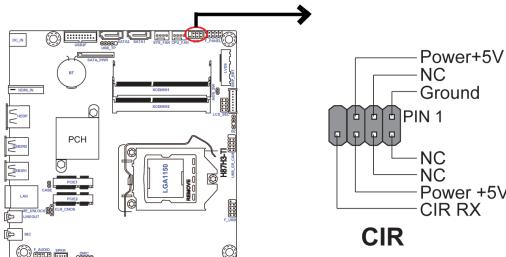
No.	Components	No.	Components
1	SATA1~2	8	DMIC
2	CIR	9	F_AUDIO
3	LVDS	10	ME_UNLOCK
4	MON_SW	11	CASE
5	DISP_BRT	12	USB_TP
6	USB_CR_CAM	13	USB3F
7	F_USB	--	--

### 1. SATA1~2: Serial ATA III connectors

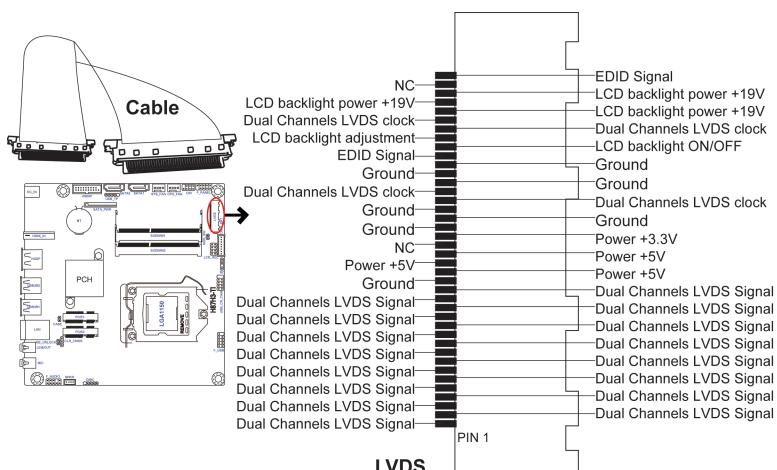
SATA1~2 connectors are used to support the Serial ATA 6Gb/s device. Simpler disk drive cabling and easier PC assembly. It eliminates limitations of the current Parallel ATA interface. But maintains register compatibility and software compatibility with Parallel ATA.



## 2. CIR: Consumer infrared header



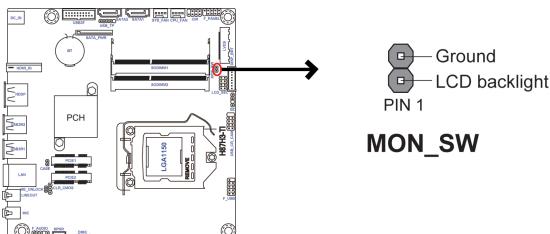
## 3. LVDS: LVDS connector (For All-In-One Specification)



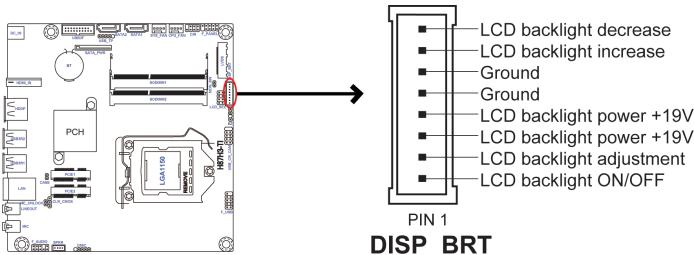
1. You can connect the large end of the cable to the LED Panel, and connect the other small end to the slot on the motherboard.

2. Due to the chipset limitation, using dual displays LVDS(AIO) + VGA or LVDS(AIO) + HDMI will cause the problem that you may not enter BIOS setup or have the display problem.

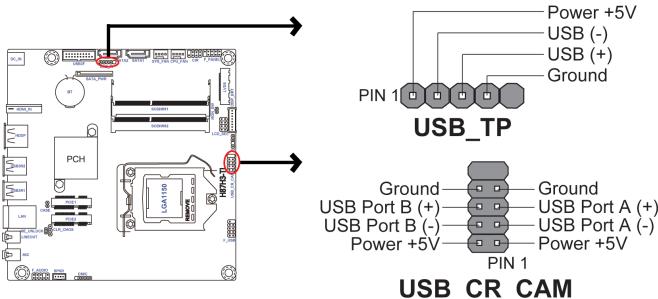
#### 4. MON\_SW: LVDS brightness switch header (For All-In-One Specification)



#### 5. DISP\_BRT: LVDS brightness control header (For All-In-One Specification)



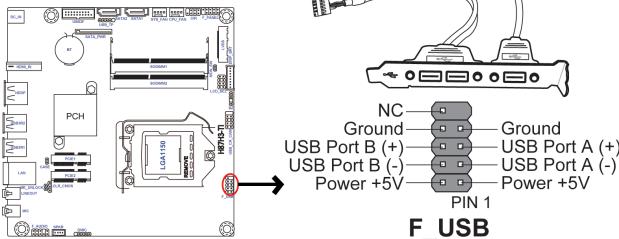
**6 & 12. USB\_TP/USB\_CR\_CAM: 5-pin USB 2.0 header supports one USB 2.0 device/10-pin USB 2.0 header supports card reader and camera or other USB 2.0 devices**



*Users please note to install the card to the correct header.*

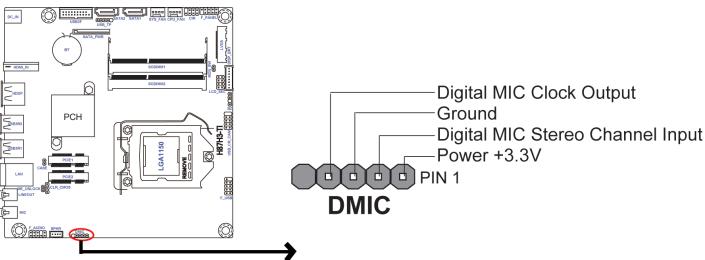
**7. F\_USB: Front Panel USB 2.0 header**

The motherboard has one USB 2.0 headers supporting two USB 2.0 ports. Additionally, some computer cases have USB 2.0 ports at the front of the case. If you have this kind of case, use auxiliary USB 2.0 connector to connect the front-mounted ports to the motherboard.



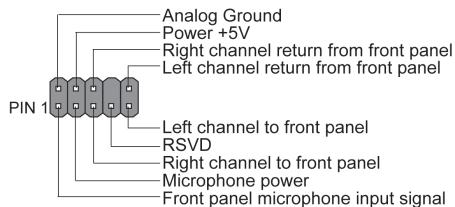
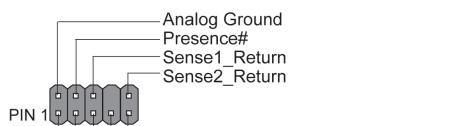
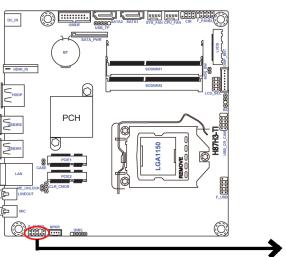
*Please make sure that the USB cable has the same pin assignment as indicated above. A different pin assignment may cause damage or system hang-up.*

## 8. DMIC: Digital microphone header (For All-In-One Specification)



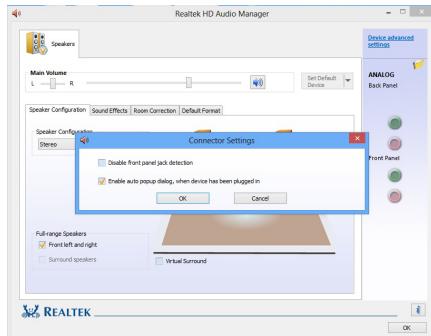
## 9. F\_AUDIO: Front panel audio header

The front panel audio header allows the user to install auxiliary front-oriented microphone and line-out ports for easier access. This header supports HD audio by default. If you want connect an AC' 97 front panel audio to HD onboard headers, please set as below picture.



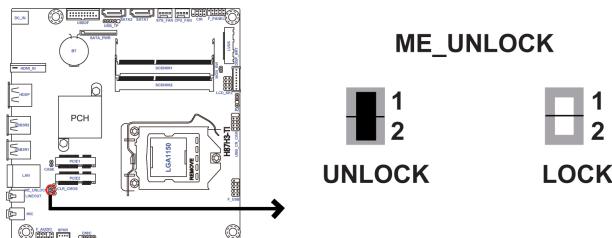
**AC' 97 Audio Configuration:** To enable the front panel audio connector to support AC97 Audio mode.

If you use AC' 97 Front Panel, please tick off the option of “Disabled Front Panel Detect”. If you use HD Audio Front Panel, please don't tick off “Disabled Front Panel Detect” .



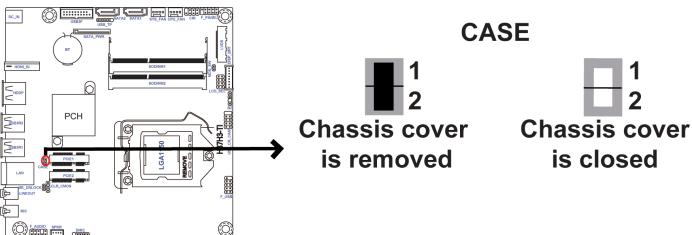
\* For reference only

## 10. ME\_UNLOCK: ME unlock header



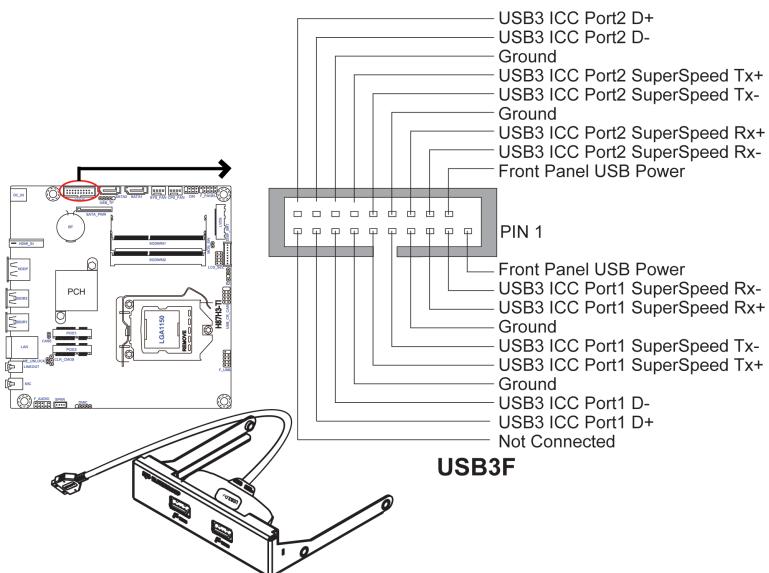
## 11. CASE: Chassis Intrusion detect header

This detects if the chassis cover has been removed. This function needs a chassis equipped with intrusion detection switch and needs to be enabled in BIOS.



## 13. USB3F: Front USB 3.0 header

This motherboard implements one USB 3.0 header supporting two extra front USB 3.0 ports, which delivers 5Gb/s transfer rate.



*To avoid the system instability after clearing CMOS, we recommend users to enter the main BIOS setting page to “Load Default Settings” and then “Save and Exit Setup”.*

## 2-4-6. Installing a Hard Disk Drive/Optical Disk Drive

This section describes how to install a Hard Disk Drive/Optical Disk Drive.

### About SATA Connectors

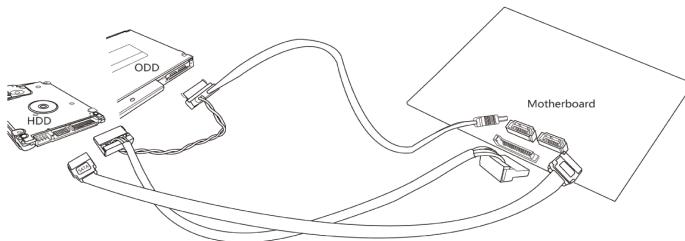
Your motherboard features two SATA connectors supporting a total of two drives. SATA refers to Serial ATA (Advanced Technology Attachment) is the standard interface for the IDE hard drives which are currently used in most PCs. These connectors are well designed and will only fit in one orientation. Locate the SATA connectors on the motherboard and follow the illustration below to install the Hard Disk Drive/Optical Disk Drive.

### Installing Hard Disk Drive/Optical Disk Drive

To install the Hard Disk Drive (HDD)/Optical Disk Drive (ODD), use the HDD/ODD/SATA cables that support the Hard Disk Drive/Optical Disk Drive/Serial ATA protocol.

Refer to the illustration below for proper installation:

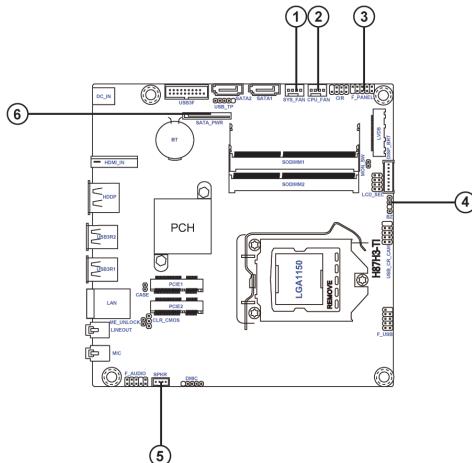
- 1 Attach either end of the single SATA cable to the SATA port on the motherboard.
- 2 Attach the other end of the single SATA cable to the hard disk drive.
- 3 Attach the linked end of the combo HDD/ODD cable to the Hard Disk Drive/Optical Disk Drive. Please note that, connect the black cable to the hard disk Drive, then connect the orange cable to the optical disk drive.
- 4 Attach the other end of the combo HDD/ODD cable to the SATA port and SATA\_PWR connector on the motherboard. Please note that, connect the black cable to the SATA\_PWR connector, and connect the orange cable to the SATA port.



\* For reference only

## 2-4-7. Connecting Case Components

After you have installed the motherboard into a case, you can begin connecting the motherboard components. Refer to the following:

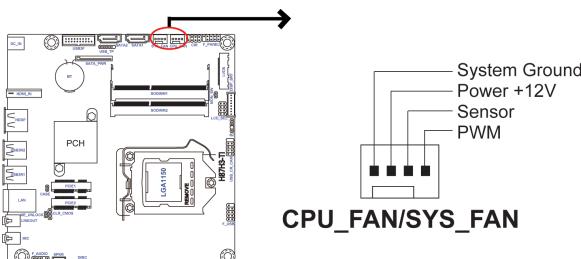


No.	Components	No.	Components
1	SYS_FAN	4	BZ
2	CPU_FAN	5	SPKR
3	F_PANEL	6	SATA_PWR

### 1 & 2 . SYS\_FAN (System cooling FAN connector) &CPU\_FAN (CPU cooling FAN connector)

Connect the CPU cooling fan cable to **CPU\_FAN**.

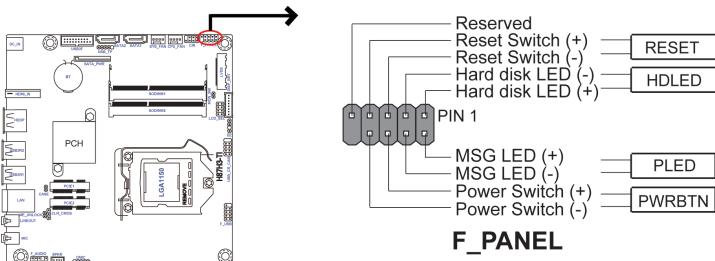
Connect the system cooling fan connector to **SYS\_FAN**.



*Users please note that the fan connector supports the CPU cooling fan of 1.1A ~ 2.2A (26.4W max) at +12V.*

### 3. F\_PANEL: Front panel header

The front panel header (F\_PANEL) provides a standard set of switch and LED headers commonly found on ATX or Micro ATX cases.



#### **Hard Drive Activity LED**

Connecting pins 1 and 3 to a front panel mounted LED provides visual indication that data is being read from or written to the hard drive. For the LED to function properly, an IDE drive should be connected to the onboard IDE interface. The LED will also show activity for devices connected to the SCSI (hard drive activity LED) connector.

#### **Power/Sleep/Message waiting LED**

Connecting pins 2 and 4 to a single or dual-color, front panel mounted LED provides power on/off, sleep, and message waiting indication.

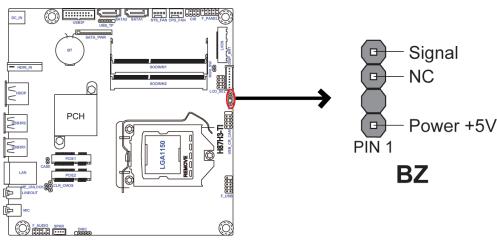
#### **Reset Switch**

Supporting the reset function requires connecting pin 5 and 7 to a momentary-contact switch that is normally open. When the switch is closed, the board resets and runs POST.

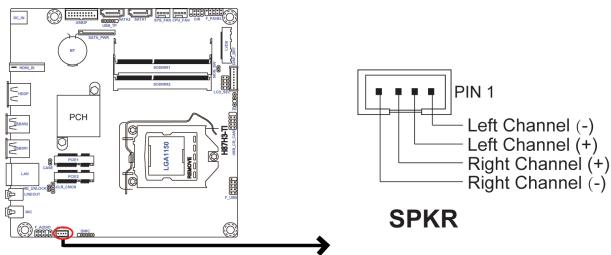
#### **Power Switch**

Supporting the power on/off function requires connecting pins 6 and 8 to a momentary-contact switch that is normally open. The switch should maintain contact for at least 50 ms to signal the power supply to switch on or off. The time requirement is due to internal de-bounce circuitry. After receiving a power on/off signal, at least two seconds elapses before the power supply recognizes another on/off signal.

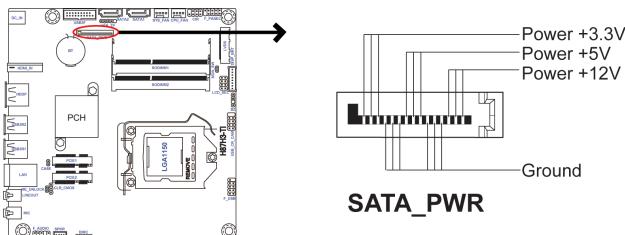
#### 4. BZ: Buzzer header



#### 5. SPKR: 2 Channel audio speaker header (For All-In-One Specification) Connect the case speaker cable to SPKR.



## 6. SATA\_PWR: SATA power connector



This concludes Chapter 2. The next chapter covers the BIOS.

*Memo*

## Chapter 2

# Chapter 3

## Using BIOS

### About the Setup Utility

The computer uses the latest “American Megatrends Inc.” BIOS with support for Windows Plug and Play. The CMOS chip on the motherboard contains the ROM setup instructions for configuring the motherboard BIOS.

The BIOS (Basic Input and Output System) Setup Utility displays the system’s configuration status and provides you with options to set system parameters. The parameters are stored in battery-backed-up CMOS RAM that saves this information when the power is turned off. When the system is turned back on, the system is configured with the values you stored in CMOS.

The BIOS Setup Utility enables you to configure:

- Hard drives, diskette drives and peripherals
- Video display type and display options
- Password protection from unauthorized use
- Power Management features

The settings made in the Setup Utility affect how the computer performs. Before using the Setup Utility, ensure that you understand the Setup Utility options.

This chapter provides explanations for Setup Utility options.

### ***The Standard Configuration***

A standard configuration has already been set in the Setup Utility. However, we recommend that you read this chapter in case you need to make any changes in the future.

This Setup Utility should be used:

- when changing the system configuration
- when a configuration error is detected and you are prompted to make changes to the Setup Utility
- when trying to resolve IRQ conflicts
- when making changes to the Power Management configuration
- when changing the password or making other changes to the Security Setup

### ***Entering the Setup Utility***

When you power on the system, BIOS enters the Power-On Self Test (POST) routines. POST is a series of built-in diagnostics performed by the BIOS. After the POST routines are completed, the following message appears:

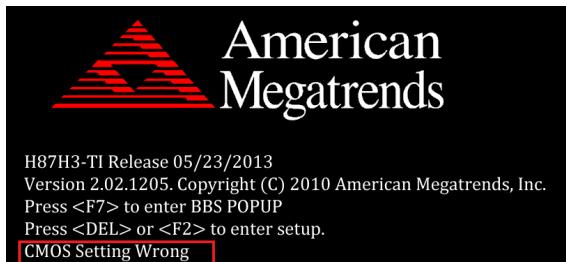
**Press DEL to enter SETUP**

Press the delete key to access BIOS Setup Utility.

## Resetting the Default CMOS Values

When powering on for the first time, the POST screen may show a “CMOS Settings Wrong” message. This standard message will appear following a clear CMOS data at factory by the manufacturer. You simply need to Load Default Settings to reset the default CMOS values.

Note: Changes to system hardware such as different CPU, memories, etc. may also trigger this message.



## Using BIOS

When you start the Setup Utility, the main menu appears. The main menu of the Setup Utility displays a list of the options that are available. A highlight indicates which option is currently selected. Use the cursor arrow keys to move the highlight to other options. When an option is highlighted, execute the option by pressing <Enter>.

Some options lead to pop-up dialog boxes that prompt you to verify that you wish to execute that option. Other options lead to dialog boxes that prompt you for information.

Some options (marked with an icon ) lead to submenus that enable you to change the values for the option. Use the cursor arrow keys to scroll through the items in the submenu.

In this manual, default values are enclosed in parenthesis. Submenu items are denoted by an icon .



*The default BIOS setting for this motherboard apply for most conditions with optimum performance. We do not suggest users change the default values in the BIOS setup and take no responsibility to any damage caused by changing the BIOS settings.*

## **BIOS Navigation Keys**

The BIOS navigation keys are listed below:

KEY	FUNCTION
<b>ESC</b>	Exits the current menu
<b>↑↓←→</b>	Scrolls through the items on a menu
<b>+/-</b>	Change Opt.
<b>Enter</b>	Select
<b>F1</b>	General Help
<b>F2</b>	Previous Value
<b>F3</b>	Optimized Defaults
<b>F4</b>	Save & Exit



1. *For the purpose of better product maintenance, the manufacturer reserves the right to change the BIOS items presented in this manual. The BIOS setup screens shown in this chapter are for reference only and may differ from the actual BIOS. Please visit the manufacturer's website for updated manual.*
2. *In this Gui BIOS, you can operate by mouse or keyboard. Click : select item; Double click: enter; Right click: exit.*

### **Language**

Select the language icon and press <Enter> or double click the left key of the mouse to display the screen. Then you can choose the language: English, Traditional Chinese, Simple Chinese, Russian, Korean, German, Spanish, Italian, Portuguese, Japanese.

### **Default**

Select the default icon and press <Enter> or double click the left key of the mouse to display the screen. Then you can load optimized defaults or not.

### **Boot**

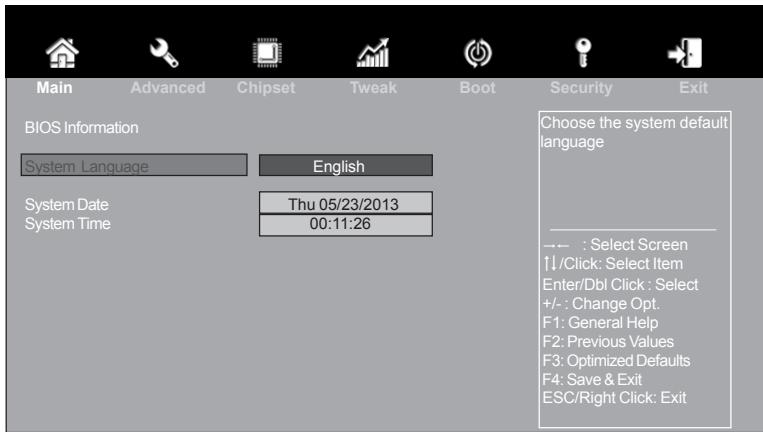
Select the boot icon and press <Enter> or double click the left key of the mouse to display the screen. Then you can choose the boot device.

### **Advanced**

Select the advanced icon and press <Enter> or double click the left key of the mouse to display the screen.

## Main Menu

This menu shows the information of BIOS and enables you to set the system language, date and time.



### System Language (English)

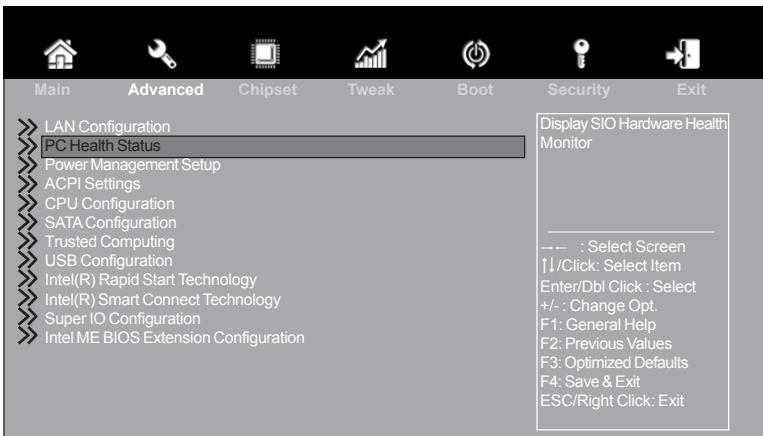
This item is used to set system language.

### System Date & Time

The Date and Time items show the current date and time on the computer. If you are running a Windows OS, these items are automatically updated whenever you make changes to the Windows Date and Time Properties utility.

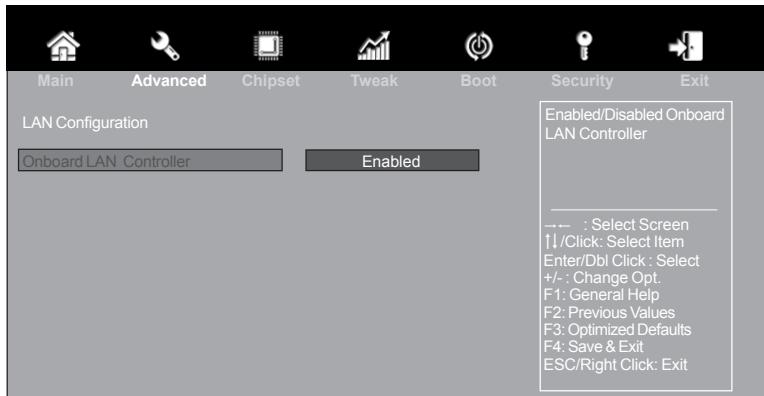
## Advanced Menu

The Advanced menu items allow you to change the settings for the CPU and other system.



## » LAN Configuration

The item in the menu shows the LAN-related information that the BIOS automatically detects.



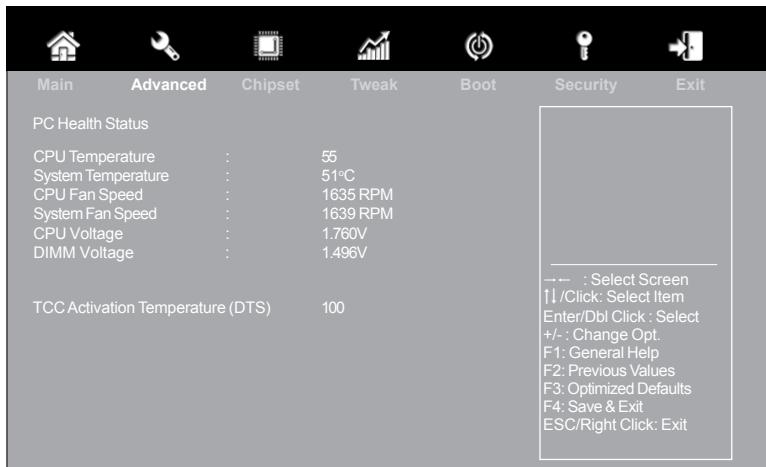
### Onboard LAN Controller (Enabled)

Use this item to enable or disable the Onboard LAN.

Press <Esc> to return to the Advanced Menu page.

## » PC Health Status

On motherboards support hardware monitoring, this item lets you monitor the parameters for critical voltages, temperatures and fan speeds.



### System Component Characteristics

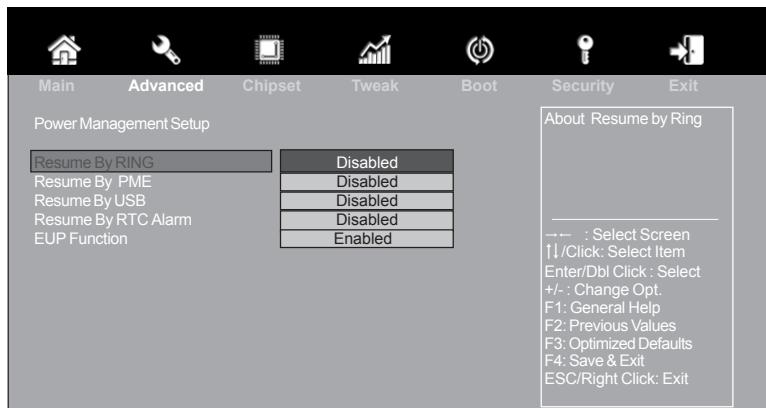
These items display the monitoring of the overall inboard hardware health events, such as System temperature, CPU & DIMM voltage, CPU & System fan speed... etc.

- CPU Temperature
- System Temperature
- CPU Fan Speed
- System Fan Speed
- CPU Voltage
- DIMM Voltage

Press <Esc> to return to the Advanced Menu page.

## » Power Management Setup

This page sets up some parameters for system power management operation.



### Resume By RING (Disabled)

An input signal on the serial Ring Indicator (RI) line (in other words, an incoming call on the modem) awakens the system from a soft off state.

### Resume By PME (Disabled)

This item specify whether the system will be awakened from power saving modes when activity or input signal of the specified hardware peripheral or components is detected.

### Resume By USB (Disabled)

This item allows you to enable or disable the USB device wakeup function from S3 mode.

### Resume By RTC Alarm (Disabled)

The system can be turned off with a software command. If you enable this item, the system can automatically resume at a fixed time based on the system's RTC (realtimeclock). Use the items below this one to set the date and time of the wake-up alarm. You must use an ATX power supply in order to use this feature.

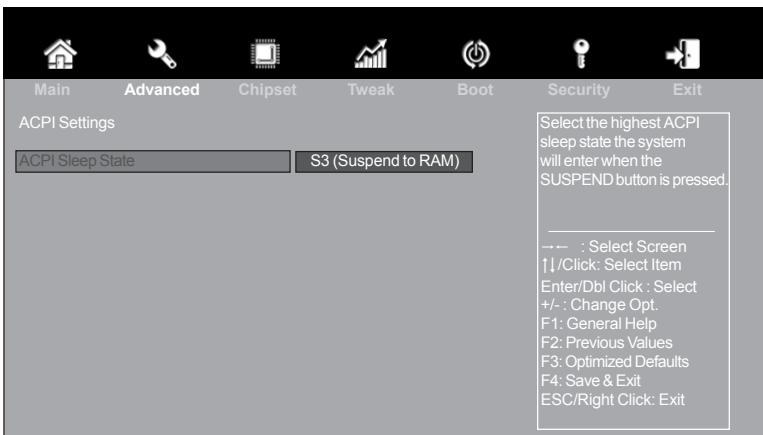
### EUP Function (Enabled)

This item allows user to enable or disable EUP support.

Press <Esc> to return to the Advanced Menu page.

## » ACPI Settings

The item in the menu shows the highest ACPI sleep state when the system enters suspend.



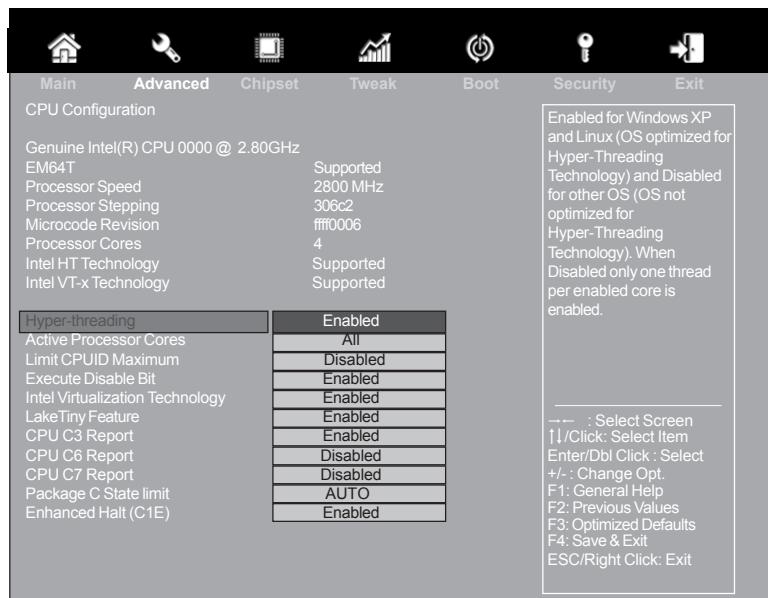
### ACPI Sleep State [S3(Suspend to RAM)]

This item allows user to enter the ACPI S3 (Suspend to RAM) Sleep State (default).

Press <Esc> to return to the Advanced Menu page.

## » CPU Configuration

The item in the menu shows the CPU configuration.



### Genuine Intel(R) CPU 0000 @ 2.80GHz

This is display-only field and displays the information of the CPU installed in your computer.

#### **EM64T (Supported)**

This item shows the computer supports EM64T.

#### **Processor Speed (2800MHz)**

This item shows the current processor speed.

#### **Processor Stepping (306a2)**

This item shows the processor stepping version.

#### **Microcode Revision (ffff0006)**

This item shows the Microcode version.

#### **Processor Cores (4)**

This item shows the core number of the processor.

#### **Intel HT Technology (Supported)**

This item shows the computer supports Intel HT Technology or not.

#### **Intel VT-x Technology (Supported)**

This item shows the computer supports Intel VT-x Technology or not.

#### **Hyper-threading (Enabled)**

This item only available when the chipset supports Hyper-threading and you are using a Hyper-threading CPU.

**Active Processor Cores (All)**

Use this item to control the number of active processor cores.

**Limit CPUID Maximum (Disabled)**

Use this item to enable or disable the maximum CPUID value limit. You can enable this to prevent the system from “rebooting” when trying to install Windows NT 4.0.

**Excute Disable Bit (Enabled)**

This item allows the processor to classify areas in memory by where application code can execute and where it cannot. When a malicious worm attempts to insert code in the buffer, the processor disables code execution, preventing damage or worm propagation. Replacing older computers with Execute Disable Bit enabled systems can halt worm attacks, reducing the need for virus related repair.

**Intel Virtualization Technology (Disabled)**

When disabled, a VMM cannot utilize the additional hardware capabilities provided by Vandor Pool Technology.

**LakeTiny Feature (Enabled)**

Use this item to enable or disable the LakeTiny for C state configuration.

**CPU C3 Report (Enabled)**

Use this item to enable or disable CPU C3 (ACPI C2) report to OS.

**CPU C6 Report (Enabled)**

Use this item to enable or disable CPU C6 (ACPI C3) report to OS.

**CPU C7 Report (Disabled)**

Use this item to enable or disable CPU C7 report to OS.

**Package C State limit (AUTO)**

Use this item to set the package C state limit.

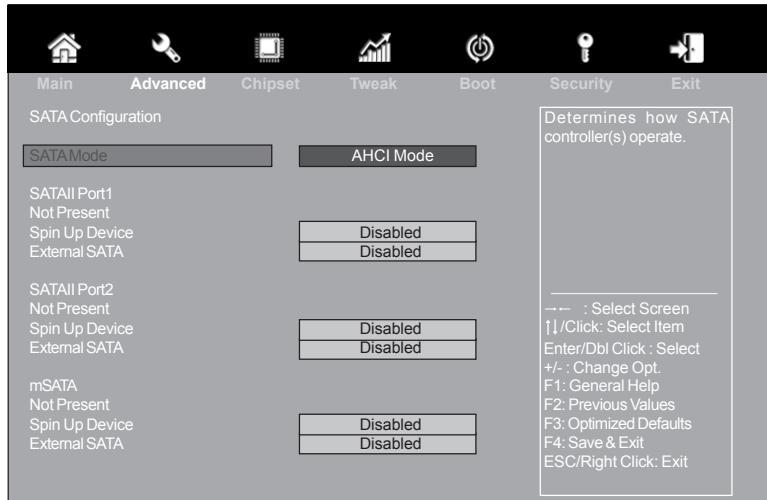
**Enhanced Halt (CIE) (Enabled)**

Use this item to enable the CPU energy-saving function when the system is not running.

Press <Esc> to return to the Advanced Menu page.

## » SATA Configuration

Use this item to show the mode of serial SATA configuration options.



### SATA Mode (AHCI Mode)

Use this item to select SATA mode.

### SATA Port 1~2/mSATA

This motherboard supports two SATA channels and one mSATA channel, each channel allows one SATA/mSATA device to be installed. Use these items to configure each device on the SATA/mSATA channel.

#### Spin Up Device (Disabled)

Use this item to enable or disable the spin up device.

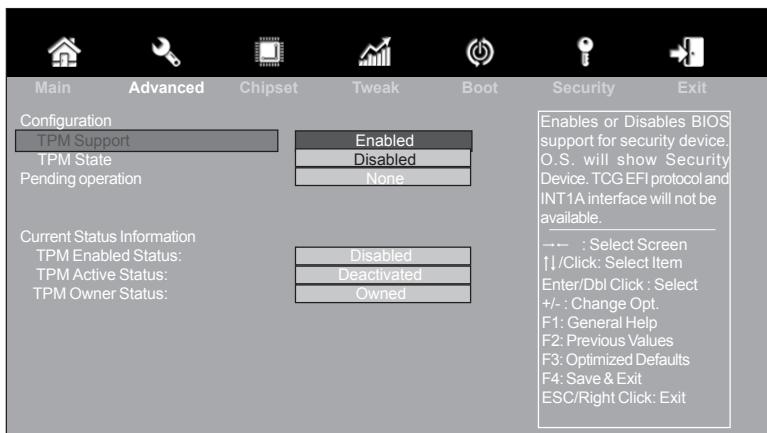
#### External SATA (Disabled)

Use this item to enable or disable the external SATA.

Press <Esc> to return to the Advanced Menu page.

## » Trusted Computing

Use this item to show the information of trusted computing configuration.



### TPM Support (Enabled)

Use this item to enable or disable the TPM port. O.S. will not show TPM. Reset of platform is required.

### TPM State (Disabled)

Use this item to enable or disable the security device.

### TPM Enabled Status (Disabled)

This item displays the TPM status to be enabled or not.

### TPM Active State (Deactivated)

This item displays the TPM status to be activated or not.

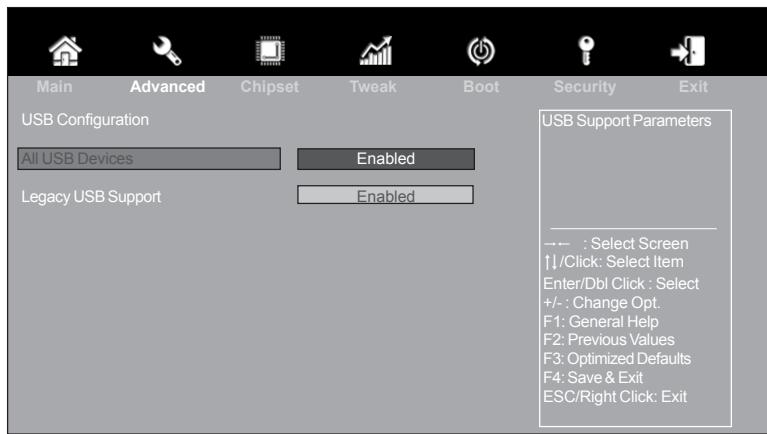
### TPM Owner State (Owned)

This item displays the TPM status to be owned or not.

Press <Esc> to return to the Advanced Menu page.

## » USB Configuration

Use this item to show the information of USB configuration.



### All USB Devices (Enabled)

Use this item to enable or disable all USB devices.

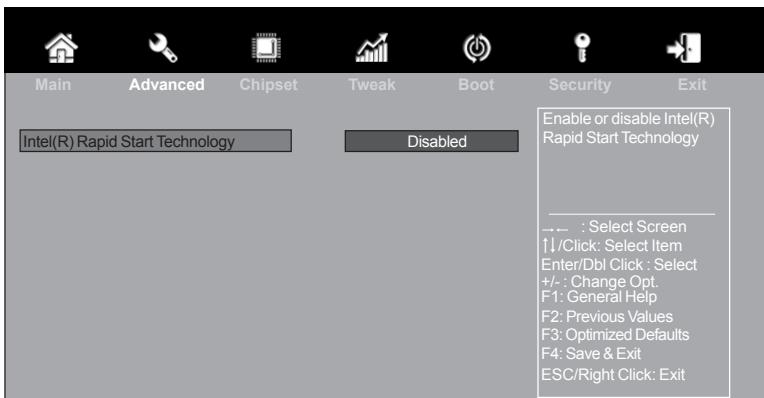
### Legacy USB Support (Enabled)

Use this item to enable or disable support for legacy USB devices.

Press <Esc> to return to the Advanced Menu page.

## » Intel(R) Rapid Start Technology

Use this item to show the information of Intel(R) Rapid Start Technology.



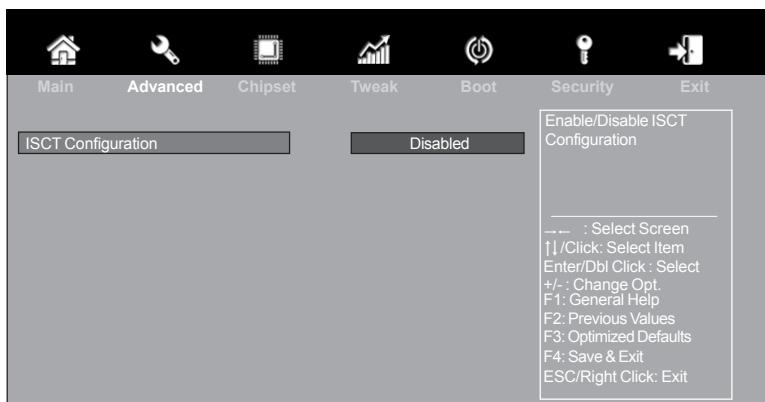
### Intel(R) Rapid Start Technology (Disabled)

Use this item to enable or disable the Intel(R) Rapid Start Technology.

Press <Esc> to return to the Advanced Menu page.

## » Intel(R) Smart Connect Technology

Use this item to show the information of Intel(R) Smart Connect Technology.



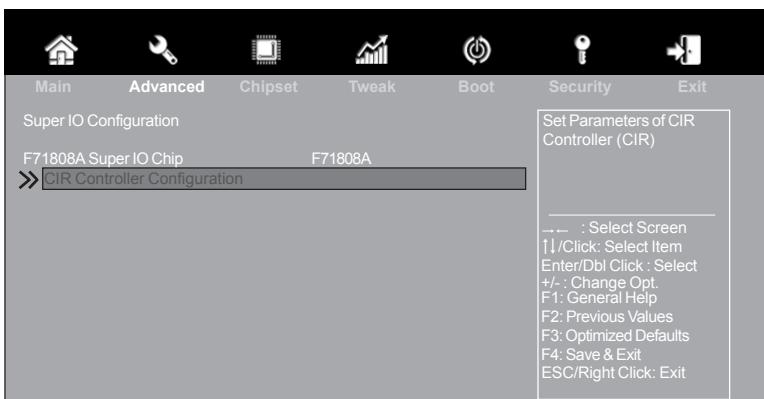
### ISCT Configuration (Disabled)

Use this item to enable or disable ISCT configuration.

Press <Esc> to return to the Advanced Menu page.

## » Super IO Configuration

Use this item to show the information of Super IO configuration.

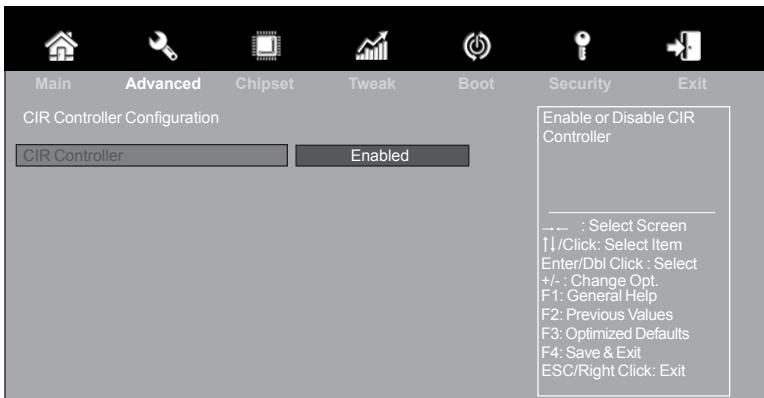


### **F71808A Super IO Chip (F71808A)**

This item shows the information of the super IO chip.

## » CIR Controller Configuration

Scroll to this item and press <Enter> and view the following screen:



### **CIR Controller (Enabled)**

This item allows you to enable or disable CIR controller.

Press <Esc> to return to the Super IO Configuration page.

Press <Esc> to return to the Advanced Menu page.

## » Intel ME BIOS Extension Configuration

Use this item to show the information of Intel ME BIOS Extension Configuration.



### **Intel AMT (Disabled)**

Use this item to enable or disable the Intel Active Management Technology (Intel AMT) function.

### **BIOS Hotkey Pressed (Disabled)**

Use this item to enable or disable the BIOS hotkey pressed.

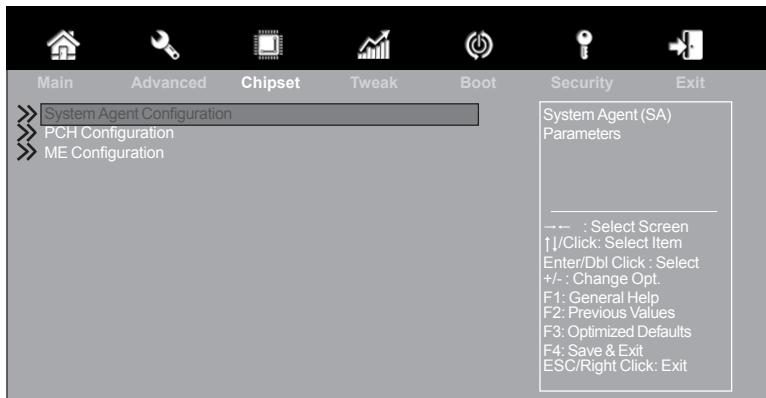
### **MEBx Selection Screen (Disabled)**

Use this item to enable or disable the MEBx selection screen.

Press <Esc> to return to the Advanced Menu page.

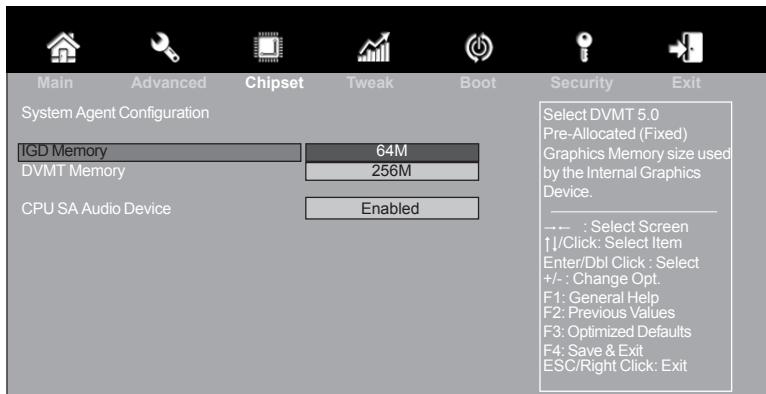
## Chipset Menu

The chipset menu items allow you to change the settings for the North Bridge chipset, South Bridge chipset and other system.



### » System Agent Configuration

Scroll to this item and press <Enter> and view the following screen:



#### IGD Memory (64M)

This item shows the information of the IGD (Internal Graphics Device) memory.

#### DVMT Memory (256M)

When set to Fixed Mode, the graphics driver will reserve a fixed position of the system memory as graphics memory, according to system and graphics requirements.

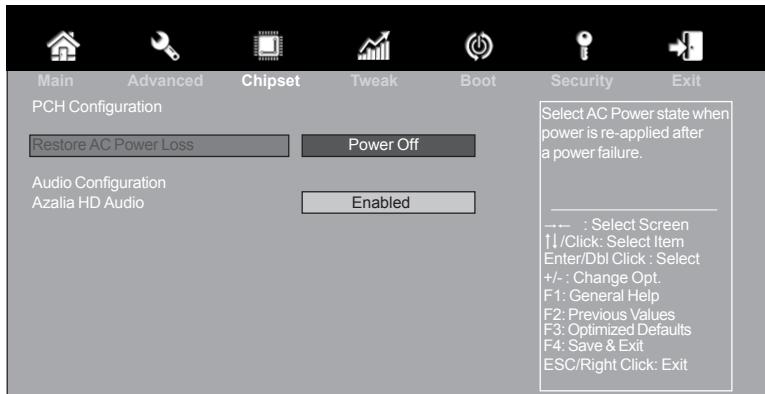
#### CPU SA Audio Device (Enabled)

This item allows you to enable or disable the CPU SA Audio device.

Press <Esc> to return to the Chipset Menu page.

## » PCH Configuration

Scroll to this item and press <Enter> to view the following screen:



### Restore AC Power Loss (Power Off)

This item enables your computer to automatically restart or return to its operating status.

### Audio Configuration

This item shows the information of the audio configuration.

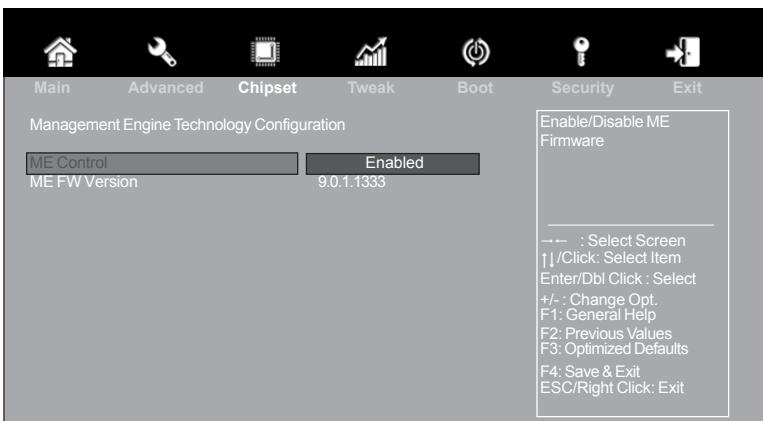
#### Azalia HD Audio (Enabled)

This item enables or disables Azalia HD audio.

Press <Esc> to return to the Chipset Menu page.

## »ME Configuration

Scroll to this item and press <Enter> to view the following screen:



### ME Control (Enabled)

Use this item to enable or disable the ME Firmware.

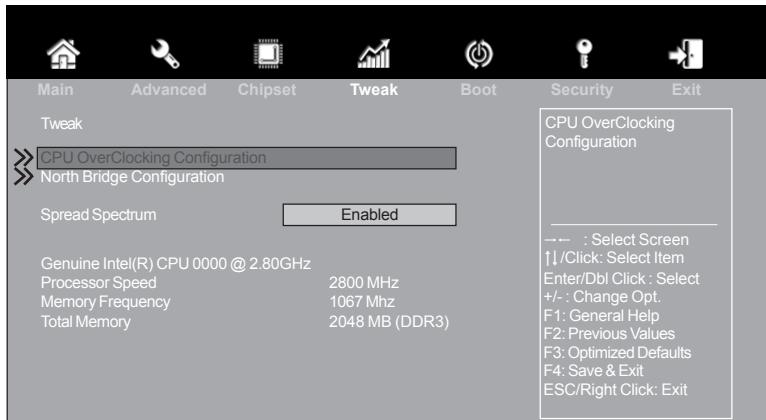
### ME FW Version (9.0.1.1333)

This item shows the ME FW version.

Press <Esc> to return to the Chipset Menu page.

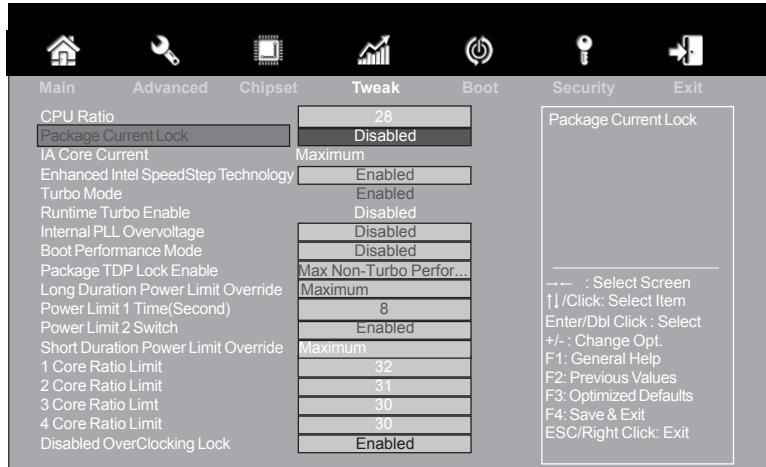
## Tweak Menu

This page enables you to set the clock speed and system bus for your system. The clock speed and system bus are determined by the kind of processor you have installed in your system.



### »CPU OverClocking Configuration

Scroll to this item and press <Enter> to view the following screen:



#### CPU Ratio (28)

This item allows users to control non turbo CPU ratio.

#### Package Current Lock (Disabled)

This item allows users to enable or disable the package current lock.

#### IA Core Current (Maximum)

This item allows you to set IA Core Current.

**Enhanced Intel SpeedStep Technology (Enabled)**

This item allows users to enable or disable the EIST (Enhanced Intel SpeedStep Technology).

**Turbo Mode (Enabled)**

This item allows you to control the Intel Turbo Boost Technology.

**Runtime Turbo Enable (Disabled)**

This item shows if CPU support runtime turbo or not.

**Internal PLL OverVoltage (Disabled)**

This item allows you to control the Internal PLL OverVoltage.

**Boot Performance Mode (Max Non-Turbo Perform...)**

Use this item to select the performance state that the BIOS will set before OS handoff.

**Package TDP Lock Enable (Disabled)**

This item allows you to enable or disable the package TDP lock.

**Long Duration Power Limit Override (Maximum)**

Intel(R) Turbo Boost Technology will use this power limit during the long duration power limit time window.

**Power Limit 1 Time(Second) (8)**

This item allows you to set the power limit 1 time.

**Power Limit 2 Switch (Enabled)**

This item allows you to enable or disable the power limit 2 switch.

**Short Duration Power Limit Override (Maximum)**

Intel(R) Turbo Boost Technology will use this power limit for a very short duration. After that, the long duration power limit will be honored.

**1 /2 /3 /4 Core Ratio Limit (32/31/30/30)**

These items show the Core Ratio limit values.

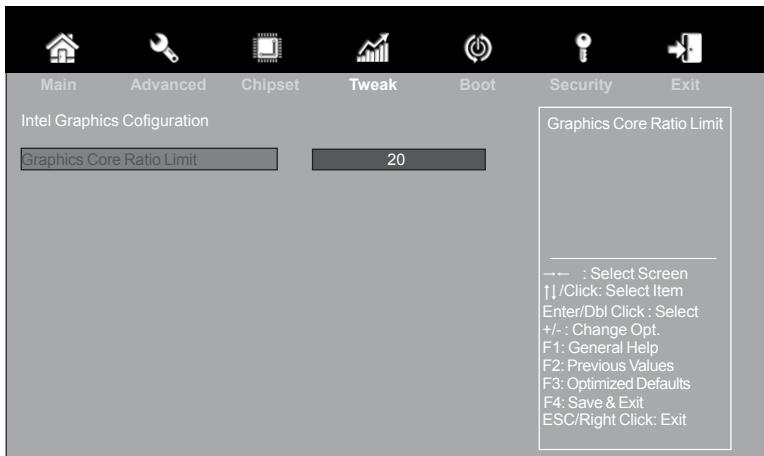
**Disable OverClocking Lock (Enabled)**

This item allows you to control the OverClocking lock.

Press <Esc> to return to the Tweak Menu page.

## » North Bridge Configuration

Scroll to this item to view the following screen:



### Graphics Core Ratio Limit (20)

This item allows you to control the internal GFX core ratio.

Press <Esc> to return to the Tweak Menu page.

**Spread Spectrum (Enabled)**

If you enable spread spectrum, it can significantly reduce the EMI (Electro-Magnetic Interference) generated by the system.

**Genuine Intel(R) CPU 0000 @ 2.80GHz**

This is display-only field and displays the information of the CPU installed in your computer.

**Processor Speed (2800 MHz)**

This item shows the current processor speed.

**Memory Frequency (1067 Mhz)**

This item shows the memory frequency.

**Total Memory (2048 MB (DDR3))**

This item shows the total memory.

**Warning:**

*Over-clocking components can adversely affect the reliability of the system and introduce errors into your system. Over-clocking can permanently damage the motherboard by generating excess heat in components that are run beyond the rated limits.*

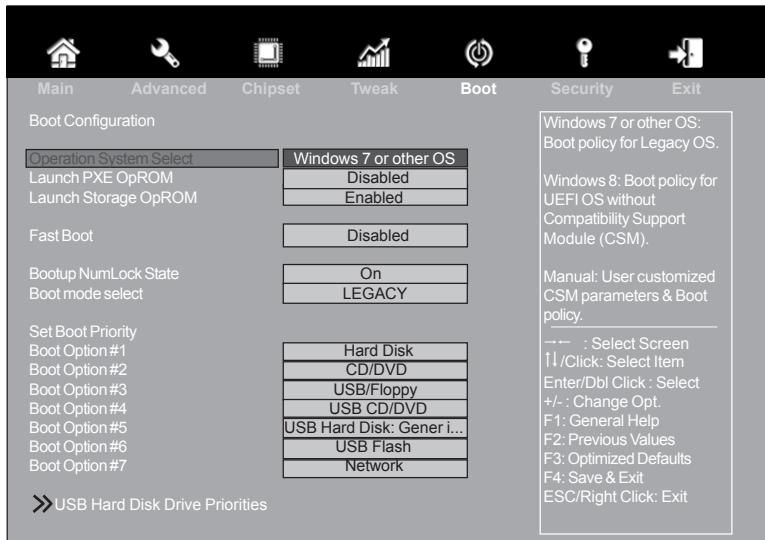
**Fail-Safe Procedures for Over-clocking**

When end-users encounter failure after attempting over-clocking, please take the following steps to recover from it.

1. Shut down the computer.
2. Press and hold the “Page Up Key (PgUp)” of the keyboard, and then boot the PC up.
3. Two seconds after the PC boots up, release the “Page Up Key (PgUp)”.
4. The BIOS returns to the default setting by itself.

## Boot Menu

This page enables you to set the keyboard NumLock state.



### Boot Configuration

This item shows the information of the Boot Configuration.

#### **Operation System Select (Windows 7 or other OS)**

This item is used to select the operation system.

#### **Launch PXE OpROM (Disabled)**

The item enables or disables launch PXE Option ROM.

#### **Launch Storage OpROM (Enabled)**

Use this item to enable or disable the Storage OpROM.

#### **Fast Boot (Disabled)**

This item enables or disables boot with initialization of a minimal set of device required to launch active boot option. Has no effect for BBS boot options.

#### **Bootup NumLock State (On)**

This item enables you to select NumLock state.

#### **Boot mode select (LEGACY)**

Use this item to select boot mode.

#### **Boot Option #1 /2 /3 /4 /5 /6 /7**

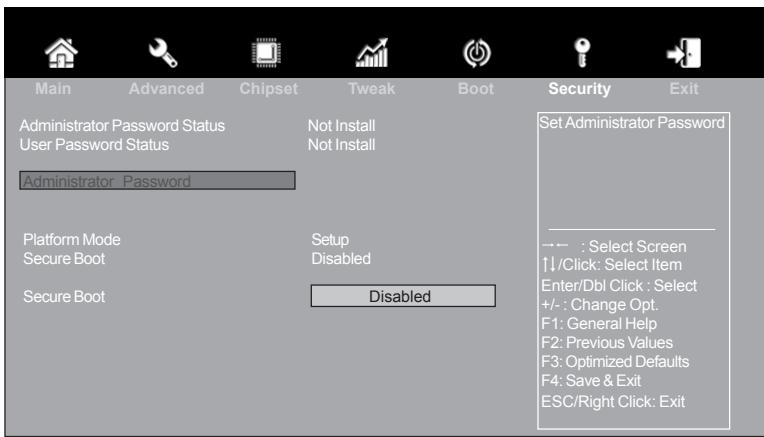
Use these items to set the system boot order.

#### **Hard Hard Disk Drive Priorities**

This item enables you to specify the sequence of loading the operating system. Press <Enter> to see the submenu.

## Security Menu

This page enables you to set setup administrator password and user password.



### Administrator Password Status (Not Install)

This item shows administrator password installed or not.

### User Password Status (Not Install)

This item shows user password installed or not.

### Platform Mode (Setup)

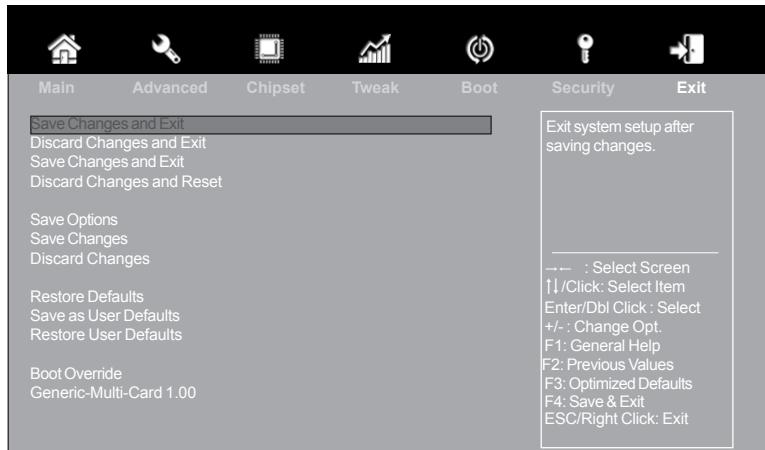
This item allows you to set the platform mode.

### Secure Boot (Disabled)

This item is used to control the secure boot flow, it is possible only if system runs in User Mode.

## Exit Menu

This page enables you to exit system setup after saving or without saving the changes.



### Save Changes and Exit

This item enables you to exit system setup after saving the changes.

### Discard Changes and Exit

This item enables you to exit system setup without saving any changes.

### Save Changes and Reset

This item enables you to reset system setup after saving the changes.

### Discard Changes and Reset

This item enables you to reset system setup without saving any changes.

### Save Options

This item enables you to save the options that you have made.

### Save Changes

This item enables you to save the changes that you have made.

### Discard Changes

This item enables you to discard any changes that you have made.

### Restore Defaults

This item enables you to restore the system defaults.

### Save as User Defaults

This item enables you to save the changes that you have made as user defaults.

### Restore User Defaults

This item enables you to restore user defaults to all the setup options.

### Boot Override

Use this item to select the boot device.

## ***Updating the BIOS***

You can download and install updated BIOS for this motherboard from the manufacturer's Website. New BIOS provides support for new peripherals, improvements in performance, or fixes for known bugs. Install new BIOS as follows:

- 1 If your motherboard has a BIOS protection jumper, change the setting to allow BIOS flashing.
- 2 If your motherboard has an item called Firmware Write Protect in Advanced BIOS features, disable it. (Firmware Write Protect prevents BIOS from being overwritten.)
- 3 Prepare a bootable device or create a bootable system disk. (Refer to Windows online help for information on creating a bootable system disk.)
- 4 Download the Flash Utility and new BIOS file from the manufacturer's Web site. Copy these files to the bootable device.
- 5 Turn off your computer and insert the bootable device in your computer. (You might need to run the Setup Utility and change the boot priority items on the Advanced BIOS Features Setup page, to force your computer to boot from the bootable device first.)
- 6 At the C:\ or A:\ prompt, type the Flash Utility program name and the file name of the new BIOS and then press <Enter>. Example: AFUDOS.EXE 040706.ROM
- 7 When the installation is complete, remove the bootable device from the computer and restart your computer. If your motherboard has a Flash BIOS jumper, reset the jumper to protect the newly installed BIOS from being overwritten. The computer will restart automatically.

This concludes Chapter 3. Refer to the next chapter for information on the software supplied with the motherboard.

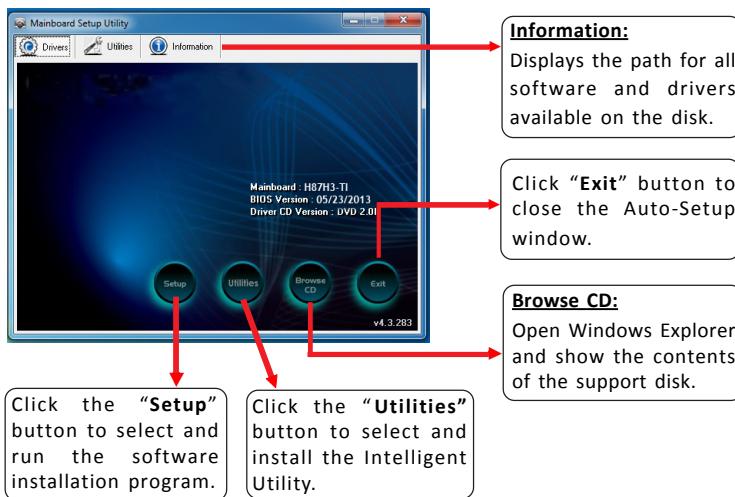
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## Chapter 4

### ***Using the Motherboard Software***

#### **Auto-installing under Windows 7/8**

The auto-install DVD-ROM makes it easy for you to install the drivers and software. The support software DVD-ROM disc loads automatically under Windows 7/8. When you insert the DVD-ROM disc in the DVD-ROM drive, the auto-run feature will automatically bring up the installation screen. The screen has four buttons on it: **Setup**, **Utilities**, **Browse CD** and **Exit**.



#### **Running Setup**

Follow these instructions to install device drivers and software for the motherboard:

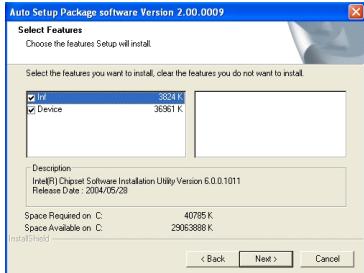
1. Click **Setup**. The installation program begins:



*The following screens are examples only. The screens and driver lists will be different according to the motherboard you are installing.*

The motherboard identification is located in the upper left-hand corner.

2. Click **Next**. The following screen appears:



3. Check the box next to the items you want to install. The default options are recommended.  
4. Click **Next** to run the Installation Wizard. An item installation screen appears:



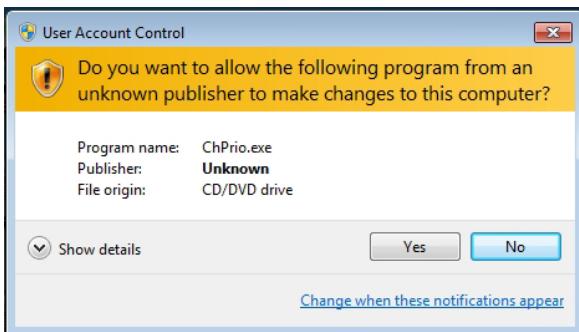
5. Follow the instructions on the screen to install the items.

 Drivers and software are automatically installed in sequence. Follow the onscreen instructions, confirm commands and allow the computer to restart a few times to complete the installation.

Windows 8 will show the following screen after system restart, you must select "Desktop" in the bottom left to install the next driver.



*Windows 7/8 will appear below UAC (User Account Control) message after the system restart. You must select “Yes” to install the next driver. Continue this process to complete the drivers installation.*



## Manual Installation

If the auto-install DVD-ROM does not work on your system, you can still install drivers through the file manager for your OS (for example, Windows Explorer). Look for the chipset and motherboard model, and then browse to the directory and path to begin installing the drivers. Most drivers have a setup program (SETUP.EXE) that automatically detects your operating system before installation. Other drivers have the setup program located in the operating system subfolder.

If the driver you want to install does not have a setup program, browse to the operating system subfolder and locate the readme text file (README.TXT or README.DOC) for information on installing the driver or software for your operating system.

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## Chapter 4

# Chapter 5

## ***Trouble Shooting***

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### **Start up problems during assembly**

After assembling the PC for the first time you may experience some start up problems. Before calling for technical support or returning for warranty, this chapter may help to address some of the common questions using some basic troubleshooting tips.

#### ***a) System does not power up and the fans are not running.***

1. Disassemble the PC to remove the VGA adaptor card, DDR memory, LAN, USB and other peripherals including keyboard and mouse. Leave only the motherboard, CPU with CPU cooler and power supply connected. Make sure the power cord is plugged into the wall socket & the switch on the Power Supply Unit (PSU) is turned “on” as well. Turn on again to see if the CPU and power supply fans are running.
2. Make sure to remove any unused screws or other metal objects such as screwdrivers from the inside PC case. This is to prevent damage from short circuit.
3. Check the CPU FAN connector is connected to the motherboard.
4. For Intel platforms check the pins on the CPU socket for damage or bent. A bent pin may cause failure to boot and sometimes permanent damage from short circuit.

#### ***b) Power is on, fans are running but there is no display***

1. Make sure the monitor is turned on and the monitor cable is properly connected to the PC.
2. Check the VGA adapter card (if applicable) is inserted properly.
3. Listen for beep sounds. If you are using internal PC speaker make sure it is connected.
  - a. continuous 3 short beeps: memory not detected
  - b. 1 long beep and 8 short beeps: VGA not detected

#### ***c) The PC suddenly shuts down while booting up.***

1. The CPU may experience overheating so it will shutdown to protect itself. Apply the thermal grease onto the CPU heatsink & ensure the CPU fan is well-connected with the CPU heatsink. Check if the CPU fan is working properly while the system is running.
2. From the BIOS setting, try to disable the Smartfan function to let the fan run at default speed. Doing a Load Optimised Default will also disable the Smartfan.

## Start up problems after prolong use

After a prolong period of use your PC may experience start up problems again. This may be caused by breakdown of devices connected to the motherboard such as HDD, CPU fan, etc. The following tips may help to revive the PC or identify the cause of failure.

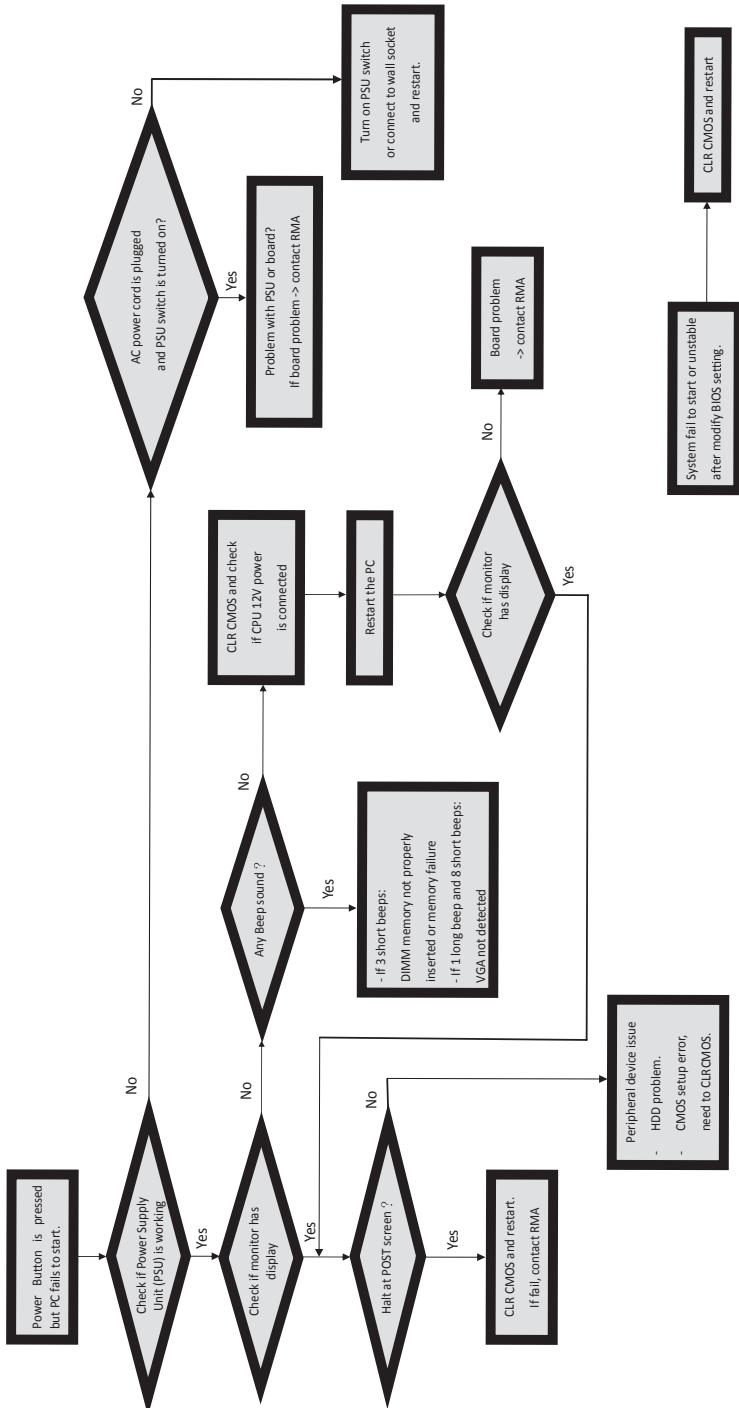
1. Clear the CMOS values using the CLR\_CMOS jumper. Refer to CLR\_CMOS jumper in Chapter 2 for Checking Jumper Settings in this user manual. When completed, follow up with a Load Optimised Default in the BIOS setup.
2. Check the CPU cooler fan for dust. Long term accumulation of dust will reduce its effectiveness to cool the processor. Clean the cooler or replace a new one if necessary.
3. Remove the hard drive, optical drive or DDR memory to determine which of these components may be at fault.
4. Check whether there is any bulked up electrolytic capacitor or abnormal component.

## Maintenance and care tips

Your computer, like any electrical appliance, requires proper care and maintenance. Here are some basic PC care tips to help prolong the life of the motherboard and keep it running as best as it can.

1. Keep your computer in a well ventilated area. Leave some space between the PC and the wall for sufficient airflow.
2. Keep your computer in a cool dry place. Avoid dusty areas, direct sunlight and areas of high moisture content.
3. Routinely clean the CPU cooler fan to remove dust and hair.
4. In places of hot and humid weather you should turn on your computer once every other week to circulate the air and prevent damage from humidity.
5. Add more memory to your computer if possible. This not only speeds up the system but also reduces the loading of your hard drive to prolong its life span.
6. If possible, ensure the power cord has an earth ground pin directly from the wall outlet. This will reduce voltage fluctuation that may damage sensitive devices.

## Basic Troubleshooting Flowchart



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## Chapter 5